REMARKS

In response to the Office Action dated June 15, 2010, claim 1 has been amended and claims 7 and 10 have been cancelled. Claim 1 is the sole independent claim. Adequate descriptive support for the present Amendment should be apparent throughout the originally filed disclosure as, for example, the depicted embodiments and related discussion thereof in the written description of the specification, including [0017] and [0058] of the application. Applicants submit that the present Amendment does not generate any new matter issue. Entry of the present Amendment is respectfully solicited. It is believed that this response places this case in condition for allowance. Hence, prompt favorable reconsideration of this case is solicited.

Claims 1-5, 7-8, 10-11 and 13-15 were rejected under 35 U.S.C. § 103(a) as obvious over Imai et al. (U.S. Pat. No. 5,001,452, hereinafter "Imai") in view of Yoshida (U.S. Pat. No. 6,340,393, hereinafter "Yoshida") and Hasegawa et al. (U.S. Patent App. Pub. No. 2002/0127405, hereinafter "Hasegawa"). Applicants respectfully traverse the rejection.

Dependent claim 12 was rejected under 35 U.S.C. § 103(a) as obvious over Imai in view of Yoshida and Hasegawa and further in view of Shi omi et al. (U.S. Pat. No. 5,252,840, hereinafter "Shiomi"). Applicants respectfully traverse the rejection.

Independent claim 1, as amended, is directed to:

> A diamond n-type semiconductor comprising a first diamond semiconductor which has n-type conduction and in which a distortion or defect is artificially formed,
>
> wherein said first diamond semiconductor contains at least one kind donor element of 5×10^{19} cm^{-3} or more in total and an impurity element other than the donor element, the contained amount of the impurity element being lower than the total contained amount of the donor element,
>
> whereby said first diamond semiconductor has an electron concentration exhibiting a negative correlation with temperature, in a temperature range having a width of 100°C or more and included within a temperature region from 0°C to 300°C,
>
> wherein the donor element includes phosphorous (P), and the impurity element includes silicon (Si) having a contained amount of 1×10^{17} cm^{-3} or more and locally

existing in said first diamond semiconductor as a material for restraining the deterioration of diamond crystallinity caused by the doping of the donor element, and

wherein both P and Si are incorporated during vapor-phase growth of said first diamond semiconductor.

As shown above, claim 1 requires that the first diamond semiconductor has an electron concentration exhibiting a negative correlation with temperature, in a temperature range having a width of 100°C or more and included within a temperature region from 0°C to 300°C. For the reasons submitted below, it is respectfully submitted that the applied prior art fails to disclose or suggest the claimed limitation.

Imai teaches a P-doped diamond, but does not teach or suggest that it has a negative correlation over the claimed specific temperature range. Similarly, Yoshida teaches that a carrier concentration increases when a donor and acceptor are introduced in a specific proportion therebetween, but Yoshida fails to teach or suggest a n-type diamond semiconductor exhibiting a negative correlation over the claimed specific temperature range. Hasegawa teaches ion implantation for Si, but does not teach or suggest a n-type diamond semiconductor exhibiting a negative correlation over the claimed specific temperature range. The prior art teaches that a conductive type of a diamond semiconductor becomes n-type even if two kinds of n-type impurities are introduced in a diamond semiconductor, but does not teach or suggest a n-type diamond semiconductor exhibiting a negative correlation over the claimed specific temperature range.

The present claimed feature that a n-type diamond semiconductor exhibits a negative correlation over a specific temperature ranges is not taught or suggested in the applied prior art, much less in combination with both P as a donor element and Si as an impurity element. There is no prior art that teaches or suggests a negative correlation with temperature, and therefore this present claimed feature of claim 1 cannot be derived from the applied prior art, absent

Applicants' own disclosure as a blue print. Furthermore, Imai teaches P doping, Yoshida teaches co-doping of a donor and acceptor, Hasegawa teaches ion implantation of Si, but none of the references teaches or fairly suggests a negative correlation with temperature to a diamond semiconductor. The present claimed structure cannot be realized even if Imai, Hasegawa, Yoshida and Shiomi are combined as suggested by the Examiner. As such, the foregoing rejections are not legally viable and should be withdrawn.

Under Federal Circuit guidelines, a dependent claim is allowable if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Thus, as independent claim 1 is allowable for the reasons set forth above, it is respectfully submitted that the remaining dependent claims are allowable for at least the same reasons as the base claim.

Accordingly, it is urged that the application, as now amended, is in condition for allowance, an indication of which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, Examiner is requested to call the undersigned attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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